Pf-2667/nec/us/mh

What is claimed is :

1. A universal serial bus function evaluator connected between a computer and an universal serial bus function, said universal serial bus function evaluator comprising :

a token storage memory for storing a token transmitted from said computer ;

a packet type judging circuit for judging a type of a return data packet returned from said universal serial bus function ; and

a functional circuit connected to said token storage memory for fetching IN token from said token storage memory and holding the same, and said functional circuit also being connected to said packet type judging circuit for receiving an information about the type of said return data packet from said packet type judging circuit, so that if said return data packet is of NAK type, then said functional circuit transmits the IN token held therein to said universal serial bus function, and if said return data packet is of either DATA type or STALL type, then said functional circuit cancels the held IN token.

2. The universal serial bus function evaluator as claimed in claim 1, wherein said functional circuit comprises :

an oscillator for generating a clock signal ;

an IN token holding circuit connected to said oscillator for receiving said clock signal and also connected to said token storage

memory for fetching IN token from said token storage memory and holding the same ; and

a timing controller connected to said oscillator for receiving said clock signal and also connected to said packet type judging circuit for receiving an information about the type of said return data packet, and said timing controller also connected to said IN token holding circuit for controlling said IN token holding circuit both in a holding timing for holding said IN token and in a transmitting timing for transmitting said IN token to said universal serial bus function.

3. The universal serial bus function evaluator as claimed in claim 2, wherein said functional circuit further comprises :

an EOP detecting circuit connected to said universal serial bus function for receiving said return packet to detect a packet end of said return packet, and said EOP detecting circuit also connected to said timing controller for sending an EPO detecting signal which represents the packet end to said timing controller.

4. The universal serial bus function evaluator as claimed in claim 1, wherein if said return data packet is of DATA type, then said functional circuit not only cancels the held IN token but also transmits ACK token.

5. The universal serial bus function evaluator as claimed in claim 4, wherein said functional circuit comprises :

an oscillator for generating a clock signal ;

an IN token holding circuit connected to said oscillator for receiving said clock signal and also connected to said token storage memory for fetching IN token from said token storage memory and holding the same ;

an ACK token transmission circuit connected to said oscillator for receiving said clock signal ; and

a timing controller connected to said oscillator for receiving said clock signal and also connected to said packet type judging circuit for receiving an information about the type of said return data packet, and said timing controller also connected to said IN token holding circuit for controlling said IN token holding circuit both in a holding timing for holding said IN token and in a transmitting timing for transmitting said IN token to said universal serial bus function,

so that if said return data packet is of DATA type, then said timing controller allows said ACK token transmission circuit to transmit an ACK token to said universal serial bus function.

6. A universal serial bus function evaluator connected between a computer and an universal serial bus function, said universal serial bus function evaluator comprising :

a token storage memory for storing a token transmitted from said computer ;

a token transmission circuit connected to said token storage

memory for transmitting a token stored in said token storage memory ;

an IN token detecting circuit connected to said token transmission circuit ;

an oscillator for generating a clock signal ;

an IN token holding circuit connected to said oscillator for receiving said clock signal and also connected to said token transmission circuit for receiving an IN token from said token transmission circuit and holding the same ;

a receiving shift register being connected to a universal serial bus function for receiving a return packet from said universal serial bus function ;

a packet type judging circuit connected to said receiving shift register for receiving said return packet and judging a type of said return packet ;

an EOP detecting circuit connected to said universal serial bus function for receiving said return packet to detect a packet end of said return packet ;

a timing controller connected to said oscillator for receiving said clock signal and also connected to said EOP detecting circuit for receiving an EOP detecting signal which represents said packet end of said return packet, said timing controller also connected to said packet type judging circuit for receiving an information about the type of said return packet, and said timing controller also connected to said IN token holding circuit for controlling said IN token holding circuit both in a holding timing for

holding said IN token and in a transmitting timing for transmitting said IN token to said universal serial bus function,

so that if said return packet is of NAK type and said timing controller receives both said return packet of NAK type and said EOP detecting signal, then said timing controller allows said IN token holding circuit to transmit the IN token held therein to said universal serial bus function, and if said return data packet is of either DATA type or STALL type, then said timing controller instructs said IN token holding circuit to hold said IN token therein.

7. The universal serial bus function evaluator as claimed in claim 6, further comprising an ACK token transmission circuit connected to said oscillator for receiving said clock signal, and if said return packet is of DATA type, then said timing controller allows said ACK token transmission circuit to transmit an ACK token to said universal serial bus function.

8. A universal serial bus function evaluating system connected between a computer and an universal serial bus function, said universal serial bus function evaluating system comprising :

means for storing a token transmitted from said computer ;

means for judging a type of a return data packet returned from said universal serial bus function ;

means for fetching IN token from said storing means and holding

the same ;

means for receiving an information about the type of said return data packet from said packet type judging circuit, so that if said return data packet is of NAK type, then said functional circuit transmits the IN token held therein to said universal serial bus function, and if said return data packet is of either DATA type or STALL type, then said functional circuit cancels the held IN token.